



Indo-US Energy Dialogue Joint Working Group on Coal

Beneficiation of Thermal Coal

Project Proposal on :
**Development of a Coal Preparation
Plant Simulator**

CMPDI



PROJECT : Development of a Coal Preparation Plant Simulator

The proposal is currently under preparation as per the standard format of S&T / CIL R&D research proposals. Main points discussed in the proposal are presented below:

- **Implementing Agency, Location & Action Point**
- **Name of Project Coordinators & Co-investigators**
- **Definition of the Problem**
- **Objective**
- **Need & Justification of Subject Area**
- **Work Plan**
 - **Methodology**
 - **Organization of Work Element**
 - **Time Schedule**
- **Details of Proposed Outlay with Justification for Capital expenditure, equipment, manpower, consumables etc.**
- **Scope & End Application**

PROJECT : Development of a Coal Preparation Plant Simulator

IMPLEMENTING AGENCIES & PARTICIPATION

➔ Implementing Agencies:

- US Government
 - Lead : Dr. Craig Zamuda, Office of Clean Energy collaboration, Office of Fossil Energy, USDOE
 - Co-Lead : Mr. Mark Sharpe, Sharpe International, Dr. Roe-Hoan Yoon, Virginia Polytechnic Institute and State University
- India Government
 - Lead : Mr. P. R. Mandal, Adviser (Projects), MoC
 - Co-Lead : Director (Engineering Services), CMPDI

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IMPLEMENTING AGENCIES & PARTICIPATION

⇒ Participation :

- India Lead – CMPDI
- Participants – MCL, SECL, CIMFR, BHEL

PROJECT : Development of a Coal Preparation Plant Simulator

OBJECTIVES

- To develop a simulation package capable of selecting optimum washery circuit, technology & equipment as well as identify optimum operating conditions of a running plant
- The package should be able to determine optimum ash level to which beneficiation should take place for a particular coal & a particular use to make it economical
- The study should consider all related issues e.g. level of washing, economics of operation of power plant, cost of washing, utilization of rejects and environmental impacts

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OBJECTIVES

- It should be able to calculate the break-even cost of washed coal for different ash levels depending upon the distance of the load center
- It should be able to determine break-even cost of washing that can be allowed for a pit-head power plant or load-center power plant, with or without reject utilization
- It should be able to determine the break-even cost of washed coal at different ash levels for different levels of plant load factor achieved due to use of washed coal

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NEED & JUSTIFICATION OF SUBJECT AREA

- ➔ An integrated Coal Preparation Simulation Program required to be developed specially for Indian coal
- ➔ Available programs e.g. MATSIM, JKSIMMET, MODSIM or CANMET are either proprietary in nature or not suitable for Indian coal
- ➔ It will help to identify the best suited technologies for different coalfields thereby restricting the loss of combustibles with rejects
- ➔ It will act as a tool for the consumers to determine the optimum ash level and likely benefits of using washed coal in power plants

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WORK PLAN - METHODOLOGY

- ➔ Develop detailed scope & schedule of work, identification of responsibilities of participants
- ➔ Compilation & analysis of existing data available, generation of additional data as necessary through extensive sampling campaign and analysis
- ➔ Model formulation for unit operations. Attempts should be made to use existing models after necessary modifications through testing. New models to be formulated wherever necessary
- ➔ Computer program generation

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WORK PLAN - METHODOLOGY

- ➔ Development of graphical user interface
- ➔ Incorporate economic analysis module involving transportation & utilisation of washed coal & rejects in power plants
- ➔ Testing of the package in terms of computational accuracy and functional aspects
- ➔ Coordinate technology transfer and delivery of products

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WORK PLAN – ORGANISATION OF WORK ELEMENT

- ⇒ MoC, India to approve the proposal through SSRC under S&T scheme
- ⇒ MCL & SECL shall identify mines and supply raw coal samples
- ⇒ Laboratory testing, pilot plant testing of various unit operations and all other testing for validation to be done by CIMFR & CMPDI
- ⇒ CMPDI to provide office & other infrastructure facilities during development & testing of the package
- ⇒ Package to be developed and validated by US agencies, necessary technical assistance to be provided by CMPDI.
- ⇒ BHEL to provide data related to power plants and economics
- ⇒ Technology transfer and delivery of product to be done by USA side.

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WORK PLAN – TIME SCHEDULE

24 months, Zero date will start with the signing of agreement between Indian & US agencies under Indo-US Energy Dialogue or receipt of letter of approval of the project under S&T/ CIL R&D scheme, whichever is later.

(Detail break-up to be worked out after consultation with all agencies involved)

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Details of Proposed Outlay

Sl. No.	Item	Total Estimate in million	
		INR*	USD (included in INR)
1	Cap. (Equipment)	0.25	-
2	Rev. Salary (CMPDI)	6.06	-
	Rev. Salary (US)	18.45	0.45
	Rev. Travels (US)	6.15	0.15
	Rev. Testing & Lab.(US)	2.05	0.05
	Rev. Testing & Lab.(Indeginous))	11.79	-
Sub-Total (Cap. + Revenue)		44.75	0.65
3	Less (US Contribution)	0.82	0.2
4	Contingency	0.66	-
Grand Total		44.59* (= USD 1.088 million)	0.45

- * Includes FE component of US \$ 0.45 million
- Assumption : 1\$ = INR 41/-

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SCOPE AND END APPLICATION

The project will deliver a much needed coal preparation plant simulator especially developed for Indian coal and to be used by Planners, Design engineers, Plant operators, Consumers, equipment manufacturers and investors related to the field of coal beneficiation in India.

CMPDI

Thank You

COAL WASHING IN INDIA

COARSE	Moving Pan Jig	250 – 30 MM
	Moving Bed Jig	100 – 0.5 MM
	HM Bath	75 – 13 MM
SMALL	Small Coal Jig	13 – 0.5 MM
	HM Cyclone	50 – 0.5 MM
	Barrel washer	50 - 13 MM
FINE	Froth Flotation	Below 0.5 MM
	Spiral Concentrator	2 – 0.1 MM
	Autogenous Cyclone	Below 0.5 MM